

Do Dutch SMEs Manage Financial Risk Rationally? Implications from an Empirical Study

R. P. M. (René-Pascal) van den Boom¹

¹ Avans University of Applied Science, Breda, The Netherlands

Correspondence: R. P. M. van den Boom, Avans University of Applied Sciences, Breda, 4818 CR, The Netherlands. Tel: 31-6-1090-4651.

Received: May 24, 2022

Accepted: June 27, 2022

Online Published: June 29, 2022

doi:10.5539/ijef.v14n7p44

URL: <https://doi.org/10.5539/ijef.v14n7p44>

Abstract

During the past decades, risk management became a safeguarding principle for management in organizations. Several models were developed, evaluated, and implemented. Research of risk management, state the professionalism at firms regarding risk management and explore determinants that explain the conceived level of risk management. The firm's size and the level of education of the risk manager seem to determine the level of risk management at individual organizations. Rational operating organizations are expected to level their risk exposure with the level of financial risk management. Our research shows at Dutch SMEs the level of risk is not aligned with the effort put into managing these financial risks. Empirical results show that none of our 8 selected risk factors are significantly related to the level of financial risk management. This implies Dutch SMEs do not rationally manage their financial risks.

Keywords: financial risk management, empirical analysis, risk factor, risk profile, rational behavior, Small and Medium-sized Enterprises (SMEs)

1. Introduction

In many regions Small and Medium-sized Enterprises (SMEs) play a crucial role in economic developments. They form the foundation for economic and social stability and are the main contributors to economic growth. Risk management is stated by several scientists to be a major concern for all companies, especially SMEs, which are particularly sensitive to business risks and competition (Blanc & Lagasse, 2006; Serveas & Tamayo, 2009). Research shows that more than large organizations, SMEs are vulnerable to unexpected shifts in financial circumstances. More than large companies SMEs seem to be unable to manage economic risks (Kozak & Danchuk, 2016) and financial risks (Belás, et al., 2018; Cipovová & Dlasková 2016). Several types of financial risks, like loan risk, asset-backed risk, credit risk, foreign investment risk, liquidity risk, market risk, operational risk, etc. are identified (Bartram et al., 2015). Saeidi et al. (2015) selected the most serious financial and economic risks: interest rate, loan availability, inflation, exchange rate, condition of the national and global economy, natural disasters, and bad weather conditions.

SMEs cannot manage risk by implementing diversified strategies (Blanc & Lagasse, 2006) due to a lack of sufficient resources. Besides that, research (Thun et al., 2011) implies the opposite effect of diversifying strategies for SMEs; SMEs experience more uncertainty in operating profits and cash flows in situations where companies operate in an increasing variety of markets and products to meet their customers' needs. However, diversifying internationally has a positive effect in terms of revenues and cash flows (Ramaswamy, 1992), although they face a higher risk of default reports due to being exposed to a variety of political and financial environments (Michael et al., 2019) and limited financial resources (Sousa, 2013; Hauschildt et al., 2006). Consequently, studies reporting methodologies determining the financial status of SMEs as well as the level of financial risk management at SMEs have increased during the last 20 years.

The basic concepts of risk management, with its definition and concepts, are generated in large firms and specific sectors and later adjusted to public operating SMEs. Moreover, scientists and practitioners have constructed models suitable for SMEs to evaluate and improve their financial risk management. A professional financial risk management model is aligned with the main risk management goals of SMEs, to adopt and implement appropriate risk assessments and strategies to mitigate the huge effects of risk on the companies' performance (Ekwere, 2016). In addition, by embedding a structured approach to risk management within SMEs,

potential benefits such as reducing over-management and organizational alignment towards the SME vision can be realized (Smit & Watkins, 2012). Therefore, SMEs should accept the concept of risk management very seriously (Azende, 2010).

Yet, managing risks within the majority of SMEs is still weak and inadequate (Spedding & Rose, 2008). Even though SMEs experience more financial risk the level of implemented risk management is lower compared to large firms. Next, to establish formal management structures, SMEs need to develop an ability to deal with ever-increasing challenges to maintain. Two studies, in particular, showed the ability to manage financial risks within SMEs is not appropriate: [1] Graydon Survey in 2014 exposed nearly 20% of all bankruptcies in The Netherlands are due to insufficient risk management practices, such as failing administration and credit control. [2] Belas et al. (2015) stated the ability to manage financial risks properly was not at an appropriate level within 75% of Czech SMEs.

The absence of proper business risk management threatens the continuity of a company by becoming illiquid. In addition, not being capable of paying debts to suppliers, loans to employees, taxes to governments, and interest payments to banks and other financial obligators leads more often to default (Balcaen & Ooghe, 2006).

Recently, next to organizations like COSO, FERMA, and ISO, who developed risk management models to construct, describe, analyze and evaluate internal risk management, research has been focusing on modeling financial risk management (Vaughan & Vaughan, 2002; Henschel, 2006; Gao et al., 2013; Monda & Giorgino, 2013; Brustbauer, 2016; de Araújo Lima et al., 2020; Van den Boom, 2020) and understanding determinants for risk management professionalism like the size of the company (Pettit & Singer, 1985; Titman & Wessels, 1988; Colquitt et al., 1999; Beasley et al., 2005; Henschel, 2008; Brustbauer, 2016; Van den Boom, 2019), the educational level of the risk manager (Colquitt et al., 1999; Bodnar et al., 2013; Van den Boom, 2019 & 2020), the organizational structure (Van den Boom, 2019), gender of the owner, type of business, presence of a risk manager (Beasley et al., 2005), etc. were examined to explain differences between companies. Risk management-related studies, especially within SMEs were mostly focused on determining and explaining the level of risk management to deal with external circumstances instead of creating methods to understand external circumstances that cause possible financial distress. Moreover, Lam (2003) stated risk management's perspective is mainly based on corporate governance despite the intention to manage financial and operational risks. Power (2009) criticized standard risk management models, for not explicitly checking risk exposure by its appetite, which is necessary for optimizing financial risk management. Falkner and Hiebl (2014) proposed further empirical research on risk identification, risk analysis, strategy implementation, and control in the risk management process. Determining the risk exposure is accepted as an important step in risk management. Indeed, it seems more logical the amount of time and energy spent on FRM is more aligned with the company's risk exposure than the earlier mentioned structural determinants. To our knowledge, the relationship between risk exposure and the level of financial risk management is not examined. This paper aims to fill this gap.

The purpose of this paper is two-folded. First, our study provides insights into the rationality of financial risk management in SME practices. A suitable framework is used to test the hypothesis that the level of a firm's financial risk management depends on the firm's risk profile. The applied model consists of the following dimensions: risk management process and organizational structure. The risk management process consists of four components: risk identification, measurement, treatment, and evaluation. The organizational structure contains firm risk policies, targets, and sources. Besides risk factors, we include control variables like size, educational level, and complexity of the firm in terms of national and international subsidiaries and degree of decentralization of the financial risk function. Second, our systematic approach may help SMEs to examine their risk profile and improve their FRM by tailoring FRM to their risk profile.

In the next section, we describe concepts of financial risk and financial risk management from a literature review. Apart from this, we discuss factors that should determine differences between companies regarding the level of financial risk management. The model applied is presented in section 3. Section 4 describes the data and relevant variables used to test the hypothesis. We describe and discuss our empirical results in section 5. Finally, section 6 summarizes the findings and recommendations.

2. Literature Review

To be capable of meeting the financial obligations managing financial risk and increasing financial performance by reducing financial costs, should be the main concern (Fetisovova, 2012; Gates et al., 2012; Offiong et al., 2019). Risk management is an evolving process that identifies the loss exposure faced by organizations based on which the most appropriate technique for addressing such exposures is selected (Smallman, 1996; Keizer et al., 2002; Rejda, 2011). Moreover, Smallman (1996) mentioned appropriate management of financial risk contains

three aspects that should be executed integrally: continuous monitoring of all sources of risk, the use of qualitative and quantitative techniques for risk assessment and monitoring, and organizational learning. Several scientists defined different consecutive steps within the risk process (Vaughan & Vaughan, 2002; Culp, 2002; Alquier et al., 2006). Although the defined steps are different, they all find their base in management circles starting with identifying the risk elements.

The importance of the first step is explicitly noticed by Belás et al. (2016). The omission of proper risk identification and definition of financial and economic risks, and not applying it to a risk management strategy negatively affects a business' sustainability. Several scientists have put the effort into describing risk. It can be seen as a fundamental concept embedded in several scientific disciplines. At its bare essence risk is defined as the combination of probability and the effects of an occurrence (ISO/IEC guidelines 73) or "risk is the combination of probability and the extent of consequences" (Ale, 2002). The quantitative impact of external uncertain factors can be measured as the effect, either negative or positive, on the uncertainty of the firm's financial goals (Fetisovova, 2012).

Stonehill et al. (1975) used shareholder value as a financial goal for listed firms. Uncertainty of equity returns effects, via Beta in cost of equity, shareholder value negatively. For non-listed firms, like SMEs, information on Betas does not exist. Beaver (1966), Altman (1968), Ohlson (1980), Altman and Sabato (2007), and Rikkers and Thibault (2009) used the probability of default (PD) as a financial risk indicator. Instead of calculating PD for each firm individually like Rikkers and Thibault, Stein (2002) estimated individual PDs using size, profitability, riskiness of industry, cash flows, and stock price volatility, as pools of similar companies. Research by Wahyudi (2014) determined cash flow (operating), capacity (portion tangible fixed assets), and leverage (debt ratio) are the major determinants of a firm's default, while gross margin and efficiency measures are significant predictors.

The probability of default is often defined as the probability a firm liquidates within a year by a lack of resources to pay off its liabilities. This probability depends on the uncertainties of expected liquidities. Moreover, in the variance of future cash flows. Scientific models which calculate PDs require available market data for a long period. Banks and other investors rely on accounting-based credit models, especially when assessing (new) creditors (Rikkers & Thibault, 2007). They use balance sheets and profit & loss statements to calculate free cash flows (FCF) as a base for estimating PD. FCF equals the amount of cash available for investors. FCF can be calculated as the cash result from the primary process of a company (cash flow from profits) minus investments in net working capital (operational cash flow) and minus investments in fixed assets, so-called capital expenditures (Copeland & Copeland, 1999). This FCF should, at least, cover the liabilities to capital investors. When the FCF is expected to be lower than its liabilities, in a planned period, it will be harder to raise funds and if at reasonable costs. In this case, the probability of default will increase.

Next to PD calculations, the literature shows Value at Risk (VaR), Cash Flow at Risk (CFaR), and Expected Shortfall (ES) as variants of PD. Culp et al. (1998) describe VaR as a summary statistic that quantifies the risk that a position declines in value with adverse market price changes. CFaR is better used when the volatility of a flow of funds is of more interest than stock value (Andr n et al., 2005). In addition to VaR and CFaR, the ES approach uses terms such as "below-target probability" (BTP) or "below-target risk" (BTR), as a particular target value below which the organization's assets (in the case of VaR) or liquidity (in the case of CFaR) must never fall (Acerbi & Tasche, 2002).

To calculate risk two approaches are commonly known. First, statistical approaches are based upon regression analysis. Here, in general, the interdependency of the variables makes this approach difficult. Especially for most information is not available (Andr n, 2005). Second, the analytical approach is based upon a mathematical model as a function of macroeconomic factors and market risk. A fundamental analysis of mapping the profit and loss statement to determine factors that influences these parts and to

what extent. De Ara  jo Lima et al. (2020) defined five different groups of risk factors. [1] Capital risk, unable to get new funding. Especially for SMEs, which are funded mostly with bank loans, unpredictable interest rates form a major risk for future financial sustainability. Zhao and Zeng (2014) state that financial risk can cause SMEs to default due to a lack of bank financing. Unlike large companies, for SMEs, it is much more complicated to take out a loan because they are not in a position to negotiate with banks about credit terms, so they may not have easy access to loans with fewer restrictions or those involving larger sums (Cenni et al., 2015). Moreover, managing income variability through lower debt ratios is extremely difficult for SMEs, due to a minimum of internal cashflows and difficulties raising equity (Moro & Fink, 2013; Dierkes, 2013). Furthermore, a poor capital structure is a major reason for banks to charge higher interest rates (Shuying & Mei, 2014). This leads to uncertainty about the interest rates for future loans and will lead to future [2] Interest rate risk. [3]

Currency risk occurs in those circumstances where companies are doing business in foreign currencies. The value of future exchanging receivables and/or payments in foreign currencies depends on the unpredictable future exchange rates. Besides the effect of fluctuation in exchange rates on the value of future receivables, [4] Credit risk occurs when companies face the risk that their customers will not be able to pay at all. [5] Financial risk is often related to being incapable of meeting financial obligations. Factors that affect this capability can be distinguished into external risks, like changes in capital markets that affect interest rates and share prices, and internal risks, like interest, currency, insolvency, and illiquidity.

3. Methodology

An empirical study to explore rational financial risk management at Dutch SMEs is conducted. Rational risk behavior implies a positive correlation between the exposure to risk and the effort organizations put into managing that risk. We expect the included control variables, level of education, and status of decentralization to correlate positively to the FRM scores. This will also be tested via multiple regression. We test the following hypothesis by applying multiple regression: H0: The level of financial risk management in Dutch SMEs is positively related to the level of financial risk.

Relevant data is gathered via a questionnaire containing three parts. Firstly, the questionnaire contains general characteristics of the SMEs including possible determinants of the level of FRM related to findings of former studies. The possible determinants are size, the education level of the risk manager, the number of subsidiaries, and the level of decentralization of the risk management function. Also included is the type of industry where the companies are operating. Five companies have their main operations in the Auditing/Training/Consulting sector, 13 in Construction, 35 in Engineering, 7 in IT, and 37 in Trade/Services/Logistics. These variables are included as dummy variables.

Secondly, questions to determine the level of FRM at individual SMEs were added to the questionnaire. FRM is defined as “a systematic and integrated approach to the management of the total of financial risks that a company faces” (Van den Boom, 2019 & 2020). The model applied is introduced in our previous study (Van den Boom, 2020) and consists of two dimensions: the risk management process and the organizational structure required for executing and monitoring the process. Each dimension contains several components, as shown in table 1. Firms’ scores on individual items were used to calculate the weighting factors using principal component analysis. The weighting factors are shown in table 1 as well. Integrating the calculated weighting factors individual scores per company can be computed per component and dimension. The dimension scores are used to calculate the FRM score using formula 1. A Disparity factor is added as an adjustment for an imbalance between both dimensions.

Formula 1 Computing FRM scores per company.

$$FRM_x = \sum [FRMp_{,x}, FRMo_{,x}] / 2 * Dfx \tag{1}$$

Whereas Dfx is calculated using the following formula:

$$Dfx = 1 - \frac{\text{Acos}(FRMp_{,x} + FRMo_{,x})}{\sqrt{2 * \sqrt{(FRMp_{,x} * FRMp_{,x} + FRMo_{,x} * FRMo_{,x})}}}$$

Table 1. Breakdown of FRM and weighting factors

Total	Dimensions	Factor dimension	Components	Factor component	Items	Factor item
FRM _x	Risk Management Process (FRMp _{,x})	0.544	A. Identification (Cp,a,x)	0.361 (Wp,a)	1. Defining risk areas	0.623
					2. Prioritizing risk areas	0.623
			B. Measurement (Cp,b,x)	0.384 (Wp,b)	3. Risk area targets	0.288
					4. Risk area exposure	0.388
					5. Risk management software	0.459
					6. Satisfaction software	0.430
			C. Treatment (Cp,c,x)	0.169 (Wp,c)	7. Risk attitude	0.601
					8. Learning programs	0.601
			D. Evaluation (Cp,d,x)	0.428 (Wp,d)	9. Process evaluation	0.313
					10. Risk area policies	0.289
					11. Reporting risk process	0.329
			Organizational Structure (FRMo _{,x})	0.544	E. Policies FRM (Co,e,x)	0.438 (Wo,e)
	13. FRM policies firm’s level	-				
	F. Sources FRM (Co,f,x)	0.342 (Wo,f)				
			G. Targets FRM (Co,g,x)	0.426 (Wo,g)	15. FRM targets firm’s level	-

Note. RMP = Risk Management Process; OS = Organizational Structure; FRM = Financial Risk Management.

Lastly, questions were added to determine risk exposure for each company. Financial risk is defined as the probability of a situation of bankruptcy when contractual debtors cannot be satisfied and structural illiquidity occurs. Moreover, when the company cannot meet its financial obligations stemming from loans and equity. So, interest payments, repayments of the principals, and dividend payments should be guaranteed by a sufficient amount of free cash flow. We use the CFaR principle to abstract risk factors.

A competitive environment is a predictor of the level of business risk (Cai & Yang, 2014; Delerue & Perez, 2009; Cera et al., 2019). Meulbroek (2002) explained several market factors that cause the variability of the expected free cash flow (FCF_{expected}). In a competitive market sales prices, demands, purchase prices, exchange rates, etc. are far more uncertain due to and lead to lower profit margin and, consequently, higher financial risk (Meulbroek, 2002). Porter (2008) constructed his 5 forces model to analyze the competitive power within a market that determines the attractiveness of a market in terms of high financial performance. He declared five forces determining the degree of competition: the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services, and the jockeying among current contestants. In general, being active in high-competitive markets leads to less individual power to determine costs, sales and revenues. The unexpected behavior of other players in the market plays an important role in realizing profits and consequently cash flows. Diversity of products and markets (Gay et al., 2002), protected revenues by patent-driven products or services, and the number of customers and suppliers (Thun et al., 2011) reflect the power of individual companies being able to control their performances. Furthermore, operating in different geographical markets leads to extra currency risk.

Next to external risks, the level of risk a firm is facing from market circumstances can be increased by its rate of fixed costs, so-called operating leverage, and the rate of an inefficient operating process ending up in a long time that invested money returns. So the level of risk also depends on the length of the cash-flow cycle which depends on the average days of sales outstanding. Finally, previous research shows a positive relationship between the debt ratio and the probability of default (Pagach & Warr, 2007; Hoyt & Liebenberg, 2008; Psillaki & Daskalakis, 2009). The selected factors are presented in Table 2. Table 2 also includes the expected relation, positive or negative, of the risk factors to the risk profile and therefore to the expected level of FRM.

Table 2. Risk factors and the expected relation to risk and FRM

Risk factor	Expected relation
Rate revenues in noneuros	positive
Number of product groups	negative
Number of markets	negative
Number of clients	negative
Rate protected revenue	negative
Number of direct competitors	positive
Equity ratio	negative
Rate of variable costs	negative

4. Data and Summary Statistics

Standard European criteria are applied for determining the size: the number of employees from 10 – 50 (small) and 50 – 250 (medium) FTE. 112 Dutch organizations participated initially. Smaller and larger firms are excluded (4). Further, exclusions are made for financials and insurance companies (3), not-for-profit organizations (1), and firms that have an ultimate parent company (5). One (1) company is excluded due to an incomplete questionnaire. Finally, the data set contains 97 Dutch SMEs.

The questionnaire used for our survey contained FRM-related questions, and data on general characteristics, risk factors, and control variables are collected. Table 3 shows an appropriate dispersion of the selected companies regarding control variables.

Table 3. Descriptives of SMEs by control variables

Control variables		n		n	Total
Subsidiaries	0	39	> 0	58	97
Educational level risk manager	<= Bachelor	54	> Bachelor	43	97
Size (FTE)	< 50	33	50 -< 250	64	97
Degree of decentralization	Centralized	52	Decentralized	45	97

Table 4 presents summary statistics of 97 Dutch SMEs that participated in this survey, classified by types of industry and the number of times that various types of risk were reported as the most important risk areas. Credit risk (48) and liquidity risk (21) are the highest self-mentioned prioritized risk areas within our survey. Companies are classified following Henschel's categorization (Henschel, 2008).

Table 4. Self-reported financial risk by type of industry

Type of Industry	Type of financial risk: main risk areas					Total
	Credit	Liquidity	Exchange rates	Interest rates	Other	
Auditing/Training/Consulting	2	3				5
Construction	7	5			1	13
Engineering	16	7	1		11	35
IT	3	2			2	7
Trade/Services/Logistics	20	3	2	1	10	36
Total	48	20	3	1	24	96

5. Results

This section describes the most important outcomes of our analysis by presenting and explaining the results of testing our hypothesis.

Table 5 shows a sufficient spread per risk factor (> 1.0). The selected factors are suitable for regression analysis. Further, 21% (6/28) of the correlations between the risk factors are significant on a .01 or .05 level, and 2 relations are significant on a .1 level. 39% (11/28) of all correlations are negative. Next, the figures show positive correlations between the number of products, the number of markets, and the number of clients. So, SMEs that diversify via a larger product portfolio reach more clients in more markets (negative impact on risk exposure). The positive correlation between markets and rate revenues in non-euros implies SMEs expand their markets across EURO-boarders (positive impact on risk exposure). SMEs with a larger rate of protected revenues also export more to different markets including non-euro countries, which leads to an increase in financial currency risks. Furthermore, SMEs with licensed products seem to deal with fewer direct competitors. The increased competitive market strength ends up in higher margins, which makes it easier to achieve a lower equity ratio, consequently, having a positive impact on risk exposure.

Table 5. Correlations between control variables and risk factors

Risk factors and control variables	Mean	St.dev	Correlations, Spearman's rho, n=97												
			1	2	3	4	5	6	7	8	9	10	11		
1. Number of subsidiaries	1,75	0,791													
2. Educational level	2,68	1,169	0,12												
3. Size	1,76	0,625	,214*	0,071											
4. Decentralization	1,53	0,614	0,11	,228*	0,036										
5. Rate revenues in non euros	1,48	1,217	0,062	0,123	0,054	-0,002									
6. Number of product groups	1,99	1,254	0,145	-0,049	0,045	0,079	0,135								
7. Number of markets	2	1,407	0,176	-0,163	-0,02	0,034	,318**	,213*							
8. Number of clients	2,98	1,614	,285**	-0,046	0,115	0,082	-0,136	,312**	-0,032						
9. Rate protected revenu	1,51	1,2	0,054	0,14	-0,112	0	,310**	0,012	0,148	-0,009					
10. Number of direct competitors	2,11	1,428	0,111	0,044	-0,067	0,031	-0,135	0,094	-0,007	-0,076	-,316**				
11. Equity ratio	2,45	1,137	-0,178	-0,063	-0,036	0,086	0,074	0,088	0,112	-0,02	0,197	-,223*			
12. Rate of variable costs	3,81	1,341	-0,1	,205*	0,177	-0,062	0,072	-0,166	-0,091	-0,092	0,167	-0,095	0,082		

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The outcomes of univariate analysis by correlations between possible determinants and FRM (sub-) items are presented in table 6. The educational level shows positive correlations to process and the final FRM scores and the number of subsidiaries. All control variables show positive correlations to FRM scores. Next, three risk factors show negative correlations with the FRM scores. Remarkably, the sample implies the rate of revenues in

non-euros, which can be seen as a criterion for exchange rate risk, is correlated negatively to FRM. Negative correlations between FRM scores and the number of markets can be explained by the fact that diversifying markets itself is a risky strategy. But then again, this should also be the case with the number of product groups. Our sample shows here a positive relationship. The number of clients also shows (significant at a .1 level) positive correlations, which implies firms with more clients seem to put more effort into managing credit risk.

Noticeably, the number of direct competitors is negatively correlated to the FRM scores. Firms acting in a more competitive market are expected to put more effort into FRM. Our study implies the opposite.

Table 6. Correlations between FRM scores and possible determinants

	Expected relationship with risk	Risk Management Process	Organizational Structure	FRM
1. Number of subsidiaries		0,159	,227*	,215*
2. Educational level		,316**	0,193	,277**
3. Size		0,109	0,136	0,151
4. Decentralization		,203*	0,068	0,124
5. Rate revenues in noneuros	positive	-0,133	0,003	-0,039
6. Number of product groups	negative	0,018	0,041	0,063
7. Number of markets	negative	-0,129	0	-0,045
8. Number of clients	neutral	0,137	0,157	0,176
9. Rate protected revenu	negative	0,14	0,11	0,148
10. Number of direct competitors	positive	-0,172	-0,168	-0,188
11. Equity ratio	negative	0,138	-0,002	0,045
12. Rate of variable costs	negative	0,156	0,166	0,142

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The results of testing the hypothesis by multiple regression are shown in table 7. Table 7 presents each variable, control variables and risk factors, the beta, and level of significance. Our model explains 19.7% of the FRM variance ($R^2 = .197$). Variables number of subsidiaries and level of education are the only significant factors at a 5%-level, which confirms the outcome of our previous study (Van den Boom, 2020). The Betas of these two variables (.234 resp. .222) confirm our expected relationship with risk management. Of all the selected risk factors number of direct competitors is close to significant (sign. = .118). Although we've expected a positive correlation, the Beta (-.168) of this factor implies the more competitive a firm operates the less attention is put into managing financial risks. Regression analysis for Engineering firms ($n = 35$) and trade/services/logistics ($n = 37$) shows different results: Engineering: only the number of subsidiaries seems to be correlated significantly to the FRM score (sign. = .057); the overall model shows a .089 adjusted R-square which implies a poor use for explaining FRM scores by our selected variables. Within the trade/services/logistic sector size and direct competitors show significant relations with FRM. However, direct competitors show a negative correlation (sign. = .006) as we expected a positive relationship. For these companies, our model explains 28,1 percent of variances of FRM scores.

Table 7. Regression analyses, FRM, Risk profile, and control variables

		Coefficients ^a		
Model		Standardized Coefficients Beta	t	Sig.
1	(Constant)		1,647	0,103
	Number of subsidiaries	0,234	2,018	0,047
	Level of education	0,222	2,005	0,048
	Size (FTE)	0,045	0,428	0,67
	Degree of decentralization	0,027	0,261	0,795
	Rate revenues in non-euros	-0,094	-0,871	0,386
	Number of product groups	0,069	0,637	0,526
	Number of markets	-0,057	-0,513	0,609
	Number of clients	0,057	0,496	0,621
	Rate protected revenu	0,078	0,72	0,473
	Number of direct competitors	-0,168	-1,581	0,118
	Equity ratio	0,036	0,354	0,724
	Rate of variable costs	0,132	1,258	0,212

a. Dependent Variable: FRM

6. Conclusions

In this study, rational risk management at Dutch SMEs is explored. From a rational perspective, the effort a firm puts into managing risks should be aligned with the risk it bears. Therefore, we have expected significant positive relationships between risk factors and the level of the firm's financial risk management. Multiple regression analysis is applied to test the following hypothesis: "H0: The level of financial risk management is positively related to companies' risk". Our previously constructed FRM scoring model (Van den Boom, 2020) is applied to score FRM for each of the 97 firms in our dataset. Risk factors, distracted from the CFaR principle, and four control variables were included. This study confirms control variables the level of education and the number of subsidiaries as determinants for FRM. Size and status of decentralization cannot be confirmed as determinants by our analysis.

Furthermore, our results show the rate of direct competitors to come close to being a determinant for the level of FRM (sign. = .118). Either, analysis shows a negative relation instead of an expected positive. The other risk factors seem to have no significant relation to FRM for SMEs in general. Some for specific business sectors. Rational behavior suggests financial risk management is tailor-made to the financial risk exposure. The statistical outcome implies H0 should be rejected. This implies for Dutch SMEs the level of financial risk management is not related to financial risk exposure.

The contribution to risk management literature is two-folded. First, we defined eight risk factors to determine the financial risk exposure. These risk factors were deducted from financial statements using the Cash Flow at Risk principle. Expected relations with the probability of default were added. Second, our study implies SMEs manage their financial risks in a rather irrational manner. Variables related to structure seem to determine the effort put into managing financial risks.

The practical value for individual risk managers lies in the possibility to examine the appropriateness of its current FRM regarding its risk profile. Also, the individual results of the questionnaire show which possible improvements can be made by taking concrete steps by the insights of the scores per item, component, dimension, and general level of FRM for their own company.

References

- Acerbi, C., & Tasche, D. (2002). Expected Shortfall: A natural coherent alternative to Value at Risk. *Economic Notes*, 31(2), 379-388. <https://doi.org/10.1111/1468-0300.00091>
- Ale, B. J. M. (2002). Risk assessment practices in The Netherlands. *Safety Science*, 40(1-4), 105-126. [https://doi.org/10.1016/S0925-7535\(01\)00044-3](https://doi.org/10.1016/S0925-7535(01)00044-3)
- Altman, E. I. (1968). Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy. *Journal of Finance*, 23(4), 589-609. <https://doi.org/10.2307/2978933>
- Altman, E. I., & Sabato, G. (2007). Modeling credit risk for SMEs: Evidence from the US market. *Abacus*, 43(3), 332-357. https://doi.org/10.1142/9789814417501_0009
- Andran, N., Jankensgard, H., & Oxelheim, L. (2005). Exposure-Based Cash-Flow-at-Risk: An Alternative to VaR for Industrial Companies. *Journal of Applied Corporate Finance*, 17(3), 76-86. <http://dx.doi.org/10.2139/ssrn.1629150>
- Azende, T. (2012). Risk Management and Insurance of Small and Medium Scale Enterprises (SMEs) in Nigeria. *International Journal of Finance and Accounting*, 1(1), 8-17. <https://doi.org/10.5923/j.ijfa.20120101.02>
- Balcaen, S., & Ooghe, H. (2006). 35 years of studies on business failure: An overview of the classic statistical methodologies and their related problems. *The British Accounting Review*, 38(1), 63-93. <https://doi.org/10.1016/j.bar.2005.09.001>
- Bartram, S. M., Brown, G. W., & Waller, W. (2015). How important is financial risk? *Journal of Financial Quantitative Analysis*, 50, 801-824. <https://doi.org/10.1017/S0022109015000216>
- Beasley, M. S., Clune, R., & Hermanson, D. R. (2005). Enterprise Risk Management: An empirical analysis of factors associated with the extent of implementation. *Journal of Accounting and Public Policy*, 24, 521-531. <https://doi.org/10.1016/j.jaccpubpol.2005.10.001>
- Beaver, W. H. (1966). Financial ratios as a predictor of failure. *Journal of Accounting Research*, 4, 71-111. <https://doi.org/10.2307/2490171>
- Belas, J., & Sopkova G. (2016). Significant determinants of the competitive environment for SMEs in the context of financial and credit risks. *J. Int. Stud.*, 9, 139-149.

- <https://doi.org/10.14254/2071-8330.2016/9-2/10>
- Bel áš, J., Smrcka, L., Gavurova, B., & Dvorsky, J. (2018). The impact of social and economic factors in the credit risk management of SMEs. *Technol. Econ. Dev. Econ.*, 24, 1215-1230. <https://doi.org/10.3846/tede.2018.1968>
- Blanc, A. A. M., & Lagasse, T. M. H. (2006). Risk management in small-and medium-sized enterprises. *Production Planning & Control*, 17(3), 273-282. <https://doi.org/10.1080/09537280500285334>
- Bodnar, G. M., Consolandi, C. G., & Jaiswal-Dale, A. (2013). Risk Management for Italian Non-Financial Firms: Currency and Interest rate Exposure. *European Financial Management*, 19(5), 887-910. <https://doi.org/10.1111/j.1468-036X.2012.00659.x>
- Brustbauer, J. (2016). Enterprise risk management in SMEs: Towards a structural model. *International Small Business Journal*, 34(1), 70-85. <https://doi.org/10.1177/0266242614542853>
- Cai, S., & Yang, Z. (2014). On the relationship between business environment and competitive priorities: The role of performance frontiers. *International Journal of Production Economics*, 151, 131-145. <https://doi.org/10.1016/j.ijpe.2014.02.005>
- Cenni, S., Monferr à S., Salotti, V., Sangiorgi, M., & Torluccio, G. (2015). Credit rationing and relationship lending. Does firm size matter? *J. Bank. Financ.*, 53, 249-265. <https://doi.org/10.1016/j.jbankfin.2014.12.010>
- Çera, G., Bel áš, J., & Strnad, Z. (2019). Important factors which predict entrepreneur's perception of business risk. *Problems and Perspectives in Management*. [https://doi.org/10.21511/ppm.17\(2\).2019.32](https://doi.org/10.21511/ppm.17(2).2019.32)
- Cipovová E., & Dlasková G. (2016). Comparison of Different Methods of Credit Risk Management of the Commercial Bank to Accelerate Lending Activities for SME Segment. <https://doi.org/10.35808/ersj/577>
- Colquitt, L. L., Hoyt, R. E., & Lee, R. B. (1999). Integrated risk management and the role of the risk manager. *Risk Management and Insurance Review*, 2(3), 43-61. <https://doi.org/10.1111/j.1540-6296.1999.tb00003.x>
- Copeland, T., & Copeland, M. (1999). Managing Corporate FX Risk—A Value Maximizing Approach. *Financial Management*, 28(3), 68-76. <https://doi.org/10.2307/3666184>
- Culp, C. L. (2002). The Revolution in Corporate Risk Management: A Decade of Innovations in Process and Products. *Journal of Applied Corporate Finance*, 14(4), 8-27. <https://doi.org/10.1111/j.1745-6622.2002.tb00445.x>
- Culp, C. L., Miller, M. H., & Neves, A. M. (1998). Value at risk: Uses and abuses. *Journal of Applied Corporate Finance*, 10(4), 26-38. <https://doi.org/10.1111/j.1745-6622.1998.tb00307.x>
- De Ara újo, L. P. F., Crema, M., & Verbano, C. (2020). Risk management in SMEs: A systematic literature review and future directions. *European Management Journal*, 38(1), 78-94. <https://doi.org/10.1016/j.emj.2019.06.005>
- Delerue, H., & Perez, M. (2009). Unilateral commitment in alliances: an optional behavior. *Journal of Management Development*. <https://doi.org/10.1108/02621710910932098>
- Dierkes, M. (2013). *Probability weighting and asset prices*. Available at SSRN 2253817. <https://doi.org/10.2139/ssrn.2253817>
- Ekwere, N. (2016). Framework of effective risk management in small and medium enterprises (SMEs): A literature review. *Bina Ekonomi*, 20(1), 23-46. <https://doi.org/10.26593/be.v20i1.1894.23-46>
- Falkner, E. M., & Hiebl, M. R. (2015). Risk management in SMEs: A systematic review of available evidence. *The Journal of Risk Finance*, 16(2), 122-144. <https://doi.org/10.1108/JRF-06-2014-0079>
- Fetisovová E. (2012). *Actual problems of small-medium enterprise finance*. Bratislava: Ekonóm.
- Gao, S. S., Sung, M. C., & Zhang, J. (2012). Risk management capability building in SMEs: A social capital perspective. *International Small Business Journal*, 31(6), 677-700. <https://doi.org/10.1177/0266242611431094>
- Gates, S., Nicolas, J., & Walker, P. L. (2012). Enterprise risk management: A process for enhanced management and improved performance. *Management Accounting Quarterly*, 13(3), 28-38. <https://hal.archives-ouvertes.fr/hal-00857435>
- Gay, G. D., Nam, J., & Turac, M. (2002). How Firms Manage Risk: The Optimal Mix of Linear and Non-Linear

- Derivatives. *Journal of Applied Corporate Finance*, 14(4), 82-93. <https://doi.org/10.1111/j.1745-6622.2002.tb00451.x>
- Glaum, M. (2002). The Determinants of Selective Exchange Risk Management- Evidence from German Non-Financial Corporations. *Journal of Applied Corporate Finance*, 14(4), 108-121. <https://doi.org/10.1111/j.1745-6622.2002.tb00454.x>
- Henschel, T. (2006). Risk management practices in German SMEs: An empirical investigation. *International Journal of Entrepreneurship and Small Business*, 3(5), 554-571. <https://doi.org/10.1504/IJESB.2006.010543>
- Henschel, T. (2008). *Risk Management Practices of SMEs: Evaluating and Implementing Effective Risk Management Systems*. Erich Schmidt Verlag GmbH & Co., Berlin.
- Hoyt, R. E., & Liebenberg, A. P. (2003). The determinants of enterprise: Evidence from the appointment of Chief Risk Officers. *Risk Management and Insurance Review*, 6(1), 37-52. <https://doi.org/10.1111/1098-1616.00019>
- Keizer, J. A., Dijkstra, L., & Halman, J. I. M. (2002). Explaining innovative efforts of SMEs: An exploratory survey among SMEs in the mechanical and electrical engineering sector in The Netherlands. *Technovation*, 22(1), 1-13. [https://doi.org/10.1016/S0166-4972\(00\)00091-2](https://doi.org/10.1016/S0166-4972(00)00091-2)
- Kozak, L. S., & Danchuk, M. V. (2016). Evolution of enterprise risk management under current conditions of economic development: From fragmented to integrated. *Actual Probl. Econ.*, 178, 23-29. http://nbuv.gov.ua/UJRN/ape_2016_4_5
- Lam, J. (2003). Ten predictions for risk management. *RMA Journal*, 85(8), 84-87.
- Meulbroek, L. (2002). *Integrated Risk Management for the Firm: A Senior Manager's Guide*. <https://doi.org/10.2139/ssrn.301331>
- Monda, B., & Giorgino, M. (2013). *An Enterprise Risk Management Maturity Model*. <https://doi.org/10.2139/ssrn.2198944>
- Moro, A., & Fink, M. (2013). Loan managers' trust and credit access for SMEs. *Journal of Banking & Finance*, 37(3), 927-936. <https://doi.org/10.1016/j.jbankfin.2012.10.023>
- Offiong, A., Udoka, C. O., & Basse, J. G. (2019). Financial risk and performance of small and medium enterprises in Nigeria. *Investment Management and Financial Innovations*, 16(4). [https://doi.org/10.21511/imfi.16\(4\).2019.10](https://doi.org/10.21511/imfi.16(4).2019.10)
- Ohlson, J. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research*, 18(1), 109-131. <https://doi.org/10.2307/2490395>
- Pagach, D., & Warr, R. (2007). An empirical investigation of the characteristics of firms adopting enterprise risk management. *North Carolina State University working paper*.
- Pettit, R. R., & Singer, R. F. (1985). Small business finance: A research agenda. *Financial Management*, 14(1), 47-60. <https://doi.org/10.2307/3665059>
- Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, 86(1), 25-40.
- Power, M. (2009). The risk management of nothing. *Accounting, Organizations and Society*, 34(6), 849-855. <https://doi.org/10.1016/j.aos.2009.06.001>
- Psillaki, M., & Daskalakis, N. (2009). Are the determinants of capital structure country or firm specific? *Small Business Economics*, 33, 319-333. <https://doi.org/10.1007/s11187-008-9103-4>
- Ramaswamy, K. (1992). Multinationality and performance: A synthesis and redirection. *Adv. Int. Comp. Manag.* 7, 241-267. <https://doi.org/10.1108/eb028910>
- Rejda, G. E. (2011). *Principles of risk management and insurance*. Pearson Education India.
- Ridders, F., & Thibault, A. E. (2009). A Structural form Default Prediction Model for SMEs, Evidence from the Dutch Market. *Multinational Finance Journal*, 13(3/4), 229-264. <https://doi.org/10.17578/13-3/4-4>
- Ridders, F., & Thibault, A. E. (2007). The optimal rating philosophy for the rating of SMEs. <http://dx.doi.org/10.2139/ssrn.966322>
- Saeidi, S. P., Sofian, S., Saeidi, P., Saeidi, S. P., & Saeidi, S. A. (2015). How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and

- customer satisfaction. *Journal of Business Research*, 68(2), 341-350. <https://doi.org/10.1016/j.jbusres.2014.06.024>
- Servaes, H., & Tamayo, A. (2009). The Theory and Practice of Corporate Risk Management. *Journal of Applied Corporate Finance*, 21(4), 60-78. <https://doi.org/10.1111/j.1745-6622.2009.00250.x>
- Smallman, C. (1996). Risk and organizational behavior: a research model. *Disaster Prevention and Management: An International Journal*, 5(2), 12-26. <https://doi.org/10.1108/09653569610112880>
- Smit, Y., & Watkins, J. A. (2012). A literature review of small and medium enterprises (SME) risk management practices in South Africa. *African Journal of Business Management*, 6(21), 6324-6330. <http://doi.org/10.5897/AJBM11.2709>
- Sousa, M. D. (2013). Just punch my bankruptcy ticket: A qualitative study of mandatory debtor financial education. *Marquette Law Rev.* 97, 391-467. <https://scholarship.law.marquette.edu/mulr/vol97/iss2/6>
- Spedding, L., & Rose, A. (2008). *Business Risk Management Handbook - A Sustainable Approach*. CIMA of Elsevier, Oxford. <http://doi.org/10.2991/icemct-14.2014.126>
- Stein, R. M. (2002). *Benchmarking default prediction models: Pitfalls and remedies in model validation*. Moody's KMV, New York, 20305. <https://doi.org/10.1023/A:1014302519570>
- Stonehill, A., Beekhuisen, T., Wright, R., Remmers, L., Toy, N., Pares, A., ... & Bates, T. (1975). Financial goals and debt ratio determinants: A survey of practice in five countries. *Financial Management*, 27-41. <https://doi.org/10.2307/3665187>
- Thun, J. H., Driike, M., & Hoenig, D. (2011). Managing uncertainty—an empirical analysis of supply chain risk management in small and medium-sized enterprises. *International Journal of Production Research*, 49(18), 5511-5525. <https://doi.org/10.1080/00207543.2011.563901>
- Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, 43(1), 1-19. <https://doi.org/10.1111/j.1540-6261.1988.tb02585.x>
- Tserng, H. P., Liao, H. H., Jaselskis, E. J., Tsai, L. K., & Chen, P. C. (2012). Predicting construction contractor default with barrier option model. *Journal of Construction Engineering and Management*, 138(5), 621-630. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000465](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000465)
- Van den Boom, R. P. (2019). Financial risk management in Dutch SMEs: An empirical analysis. *Journal of Financial Risk Management*, 8(2), 55-72. <https://doi.org/10.4236/jfrm.2019.82005>
- Van den Boom, R. P. (2020). Financial Risk Management in SMEs: A New Conceptual Framework. *International Business Research*, 13(10), 1-85. <https://doi.org/10.5539/ibr.v13n10p85>
- Vaughan, E. J., & Vaughan, T. (2002). *Essentials of risk management and Insurance*. Wiley.
- Wahyudi, I. (2014). Default risk analysis in micro, small and medium enterprises: Does debt overhang theory occur? *Asian Academy of Management Journal of Accounting and Finance*, 10(1), 95-131. <https://doi.org/10.2139/ssrn.2259371>
- Zhao, S., & Zeng, M. (2014). Theory of SMEs financial risk prevention and control. In *2014 International Conference on Education, Management and Computing Technology (ICEMCT-14)*, 514-517. Atlantis Press. <https://doi.org/10.2991/icemct-14.2014.126>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).